LONDON SOUTH BANK UNIVERSITY

module guide

Human Evolution, Physiology and Behaviour

FBS_5_202

2017-2018

School of Applied Sciences

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1. MODULE DETAILS

Module Title:	Human evolution, physiology and behaviour
Module Level:	Level 5
Module Reference Number:	FBS_5_202
Credit Value:	1 (20 CATS Points)
Student Study Hours:	150
Contact Hours:	Approximately 45 hours
Private Study Hours:	Approximately 105 hours
Course:	BSc (Hons) Biosciences BSc (Hons) Environmental Biology BSc (Hons) Human Biology BSc (Hons) Human Nutrition HND Applied Biology
Year and Semester	2016-2017, Semester 2
Module Coordinator:	Dr John Seeley
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This module guide is designed to help you structure your learning by providing an indicative structure and content for the module. It is a guide and not a definitive statement of what you will be taught. We will try to follow this published schedule as far as possible, but there may be some variation as the module develops and as we try to match the pace and content of our teaching to your needs.

2. SHORT DESCRIPTION

This module is about the human evolutionary story: the relation of humans to other primates, the various hominins represented in the fossil record, the relations between primates represented in bodily anatomy and physiology, and the story of early humans as

recorded through artefact and archaeology. Study of the unit involves formal sessions as lectures and talks by students, discussions and workshop activities.

3. AIMS OF THE MODULE

- To develop understanding of the main evolutionary events in the Family Hominidae.
- To explore the main selective pressures thought to have been instrumental in the evolution of the hominids.
- To enable you to marshal evidence to discuss current theories about human ancestry and geographical distribution.
- To enable you to critically evaluate explanations for the adaptive significance of changes seen in the human fossil record and the evolutionary development of particular human skills.
- To develop your understanding of the major human physiological systems as matched to the requirements of an evolved and responsive animal.
- To explore the extent to which human individual and social skills are reflected in brain structures and mechanisms.
- To review the significance of language in relation to human anatomy, physiology, evolution and anthropology.
- To develop an appreciation of the physiological and mental adaptability of humans, and the contribution of each to the speciation and dispersal of the hominids.
- To review the use of genetic evidence in relation to human evolution.
- To review the use of evidence from archaeological and anthropological studies in relation to human cultural development.

4. LEARNING OUTCOMES

4.1 Knowledge and Understanding

- To describe the phylogenetic relationships of the Hominoidea and their distinctive features from other primates

- To set out the phylogenetic relations of the Hominidae including the ancestry of modern *Homo sapiens sapiens* as accepted by most palaeoanthropologists

- To list the principal features of the various species of *Australopithecus* and *Homo* and their presumed adaptive significance

- To justify the changes observed in the human skull and brain as different ecological niches are exploited

- To review the various theories which seek to explain the expansion of brain size in both primates, hominoids and hominids

- To review alternative theories of human evolution, including those based on the peculiarities of our physiology and behaviour, (e.g. the “aquatic ape” theory)

- To review the mechanisms by which the somatic motor and visual systems function and how motor and visual abilities relate to the evolutionary past

- To review the means by which the major physiological systems of the human body operate on a variety of timescales and with appreciable responsiveness

- To review theories of the evolution of motor skill and language skill

- To describe relations between neural mechanisms and human sociality in relation to general social interactions and to language

4.2 Intellectual Skills

- To distinguish between evidence-based descriptions of adaptive change and speculative theories

- To apply deductive reasoning to evidence from the human fossil record whilst recognising its limitations

- To critically review the application of evidence from studies of the great apes to human biology, physiology and behaviour, especially in the context of experimental studies

- To distinguish between descriptions of physiological mechanism and speculations on physiological design

- To distinguish between serial and parallel modes of physiological and information processing and describe the implications for causality

4.3 Practical Skills

- To collate evidence and present a succinct account of recent work or particular ideas about human evolution to their peers

- To consider possible metrics and experimental protocols that might effectively test a hypothesis about human origins or behaviour

- To give direct descriptions of physiological mechanism having due regard to various levels of organisation from molecule to system

4.4 Transferable Skills

- To practise data analysis and presentation

- To develop deductive reasoning and criticism.

- To evaluation the limits of data

- To develop literacy skills, principally in dealing with complex subjects that need to be ordered systematically and described clearly and comprehensively

- To develop exposition, turn-taking and questioning skills appropriate to small group discussion

5. ASSESSMENT OF THE MODULE

Coursework 1: Presentation (40% of module mark)
The presentation involves your collaboration with a fellow student in the production and delivery of a 30-minute talk on a particular aspect of evolution, chosen from a list of topics.

Coursework 2: In-class test (60% of module mark)
The in-class test involves your participation in two separate one-and-a-half-hour tests. These will be based around a previously supplied article from the popular or scholarly press, released at least 10 days before the first test. You will be expected to make responses based on close and critical reading of the article. Roughly one third of the marks for the test will be awarded for your account of the topic based on your background reading and research.
Your work for the first test will be marked and your marks and scripts will be returned to you. You will have an opportunity to improve on your initial efforts in the second test. The mark for the second test will be your final mark.

6. FEEDBACK

Verbal feedback on group talks will be given privately immediately after the talk. Feedback on critical reflections on talks and on topic summaries will be given within the three-week period of the final hand-in date in Semester 2. (This schedule prevents students talking later in the module from gaining unfair advantage.)

7. INTRODUCTION TO STUDYING THE MODULE

How does an understanding of our evolutionary history help to explain human biology, particularly our physiology and behaviour? Do we need to understand how other animals are adapted by their biology and behaviour to their habitat to explain how humans arose?

This module attempts to give a complete and integrated account of human biology – we will argue that understanding our evolutionary history helps to explain not only our basic physiology and anatomy but our behaviour and social structures. Recent fossil finds and advances in genetics have greatly expanded our understanding of human evolution and our relations to other primates. Today, there is one species of human on the Earth – 40,000 years ago there were at least three, and further back there may have been as many as five extant species in Africa and the Middle East. Why does just *Homo sapiens sapiens* remain? What has made us so successful?

In this module, we will require you to bring together information from the three principal areas of our teaching: evolutionary ecology, physiology and behavioural studies. You will need to integrate the information from these areas to understand the characteristic features of human biology – for example, human brain anatomy and physiology, the selective advantages of speech and the social and behavioural changes that follow from a shared language.

7.1 Overview of the Main Content

Human evolution
The *Primata*, *Hominoidea* and *Hominidae*
Bipedalism and the rise of the humans - *Australopithecus* and *Homo*
Environmental changes and our phylogenetic separation from the other Great Apes
Timescales, fossil finds and the key anatomical changes preserved in the fossil record
Changes in behaviour and ecological niche as indicated by these differences
Tool usage and the arrival of *Homo*
Different tool technologies
The changes in skull shape and brain size between *Australopithecus* and *Homo*
Changes in brain anatomy and mental function *in Homo*
The Neanderthals and their demise
Modern humans and theories explaining their distribution
Homo floresiensis
Alternative scenarios for the evolution of *Homo*
Archaeology, anthropology and the evolution of human culture
Genetic and linguistic evidence in the dispersal of modern humans
Modern human behaviour and evolutionary psychology

The individual human
Physiology of human systems – the motor system (somatic) and a sensory system (vision)
Visual system as multifunctional and adapted to selective pressures (vision of colour, detail, identification, location, movement; speed of visual response; comparative visual physiology)
Motor system as a conscious and unconscious processor (i.e. involuntary and voluntary movement)
Human physiological responsiveness (short-term – fight/flight response; long-term – neural and muscle responses to loading and unloading
Muscle fibre types
Comparative motor ability
Movement in response to stimulus; effective movement as the outcome of decision making
Motor skill and the learning of motor skill; motor models

The social human
General sociality (social models, theory of mind, mirror neurons)
Learning (physiological responsiveness); learning and sociality; learning and navigation; local and network mechanisms in learning
Human language as an evolved motor skill; gesture and gestural languages; brain physiology and language

7.2 Overview of Types of Classes
Classes will involve discussions, workshop activities and more formal presentations given by both students and lecturers.

7.3 Importance of Student Self-Managed Learning Time
You are expected to carry out approximately 210 hours of private study as part of this module. This is the most substantial component of the module time for a simple reason: it is the most important part. You should read around the subject for a given week both **before** and **after** the class. You will also be supplied with various articles and pieces of commentary as a basis for the discussions. Lectures will provide overviews and key

points of study - your learning must also come from your reading, your annotation and expansion of lecture notes and your active effort in developing knowledge and understanding of the materials and concepts. You are **very strongly advised** to purchase one or other of the core texts on evolution and physiology. Success in the module depends on your constructive use of private study time, likely including study and discussion with fellow students.

The module Moodle site is a helpful resource of reading, materials and physiological illustrations.

7.4 Employability

This module involves acquiring information and resources and both independent and co-operative effort. You will give a talk on a single topic along with fellow members of a small group. Significant time will be allocated to preparation for the talk and it is to be delivered to a professional standard. You will participate in a quite a number of discussions over two semesters and develop your capabilities in IT. You will therefore be developing various skills that are directly transferable to the world of work.

8. THE PROGRAMME OF TEACHING, LEARNING AND ASSESSMENT

This is to be found in the Module Timetable.

The Module Timetable will be supplied in two versions. Version 1 will be given out at the start of the module. It maps out in detail the activities for the first half of Semester 1 and provides an outline of activities for the rest of Semester 1 and for Semester 2. When you and your fellow students have settled on your topics for study and presentation you will be supplied with Version 2 of the Timetable. This will provide a detailed schedule for the whole of the two semesters, allowing for the balancing of arrangements of sessions run by teaching staff and your student group.

9. STUDENT EVALUATION

10. LEARNING RESOURCES

10.1 Core Materials

Bear M F and Connors B (2015) *Neuroscience: Exploring the Brain* (4th Edn). Wolters Kluwer

Foley R A and Lewin R (2004) *Principles of Human Evolution*. Blackwell Publishing

Lewin R (2004) *Human Evolution* (5th Edn). Blackwell Scientific

Lieberman D (2014) *The Story of the Human Body*. Penguin Books

Lodish H et al (2007) *Molecular Cell Biology* (6th Edn). Sinauer

10.2 Optional Materials

Additional reading

Bahn P & Vertut J (1997) *Journey through the Ice Age*. University of California Press

Beeby A N & Brennan A-M (2004) *First Ecology* (2nd Edn). Oxford University Press

Calvin W H (2000) *The Ascent of Mind: Ice Age Climates and the Evolution of Intelligence*. Backinprint.com

Cartwright, J (2000) *Evolution and Human Behaviour*. Palgrave Macmillan

British Medical Association (1998) *Human Genetics: Choice and Responsibility*. Oxford University Press

Cavalli-Sforza L & Cavalli-Sforza F (1995) *The Great Human Diasporas*. Addison Wesley

Deacon T (1997) *The Symbolic Species*. Allen Lane

FitzGerald, M J T, Gruener & Mtui E (2006) *Clinical Neuroanatomy and Neuroscience* (5th Edn). Elsevier Health Sciences

Jones S Martin R D & Pilbeam D R (1994) *The Cambridge Encyclopaedia of Human Evolution*. Cambridge University Press

Jorde L B, Carey J C, Bamshad M J & White R L (2000) *Medical Genetics* (2nd Edn). Mosby

Lieberman D E (2011) *The Evolution of the Human Head*. Belknap Press

Mithen S (1996) *The Prehistory of the Mind*. Thames & Hudson

Rosenzweig M R, Breedlove S M & Watson N V (2007) *Biological Psychology: An Introduction to Behavioral and Cognitive Neuroscience*. Sinauer Associates

Siegel A & Sapru H N (2006) *Essential Neuroscience*. Lippincott Williams & Wilkins

Silverthorn D U (2009) *Human Physiology: An Integrated Approach*. Benjamin Cummings

Sloan P R (ed) (1997) *Controlling our destinies: Human Genome Project from Historical, Philosophical, Social and Ethical Perspectives*. University of Notre Dame Press

Squire L R & Kandel E R (2008) *Memory: From Mind to Molecules*. Roberts & Company

Sudbery P (1998) *Human Molecular Genetics*. Longman

Strachan T and Read AP (1999) *Human Molecular Genetics* (2nd Edn). Wiley-Liss

Wills C (1992) *Exons, Introns and Talking Genes: The Science Behind the Human Genome Project*. Basic Books

Wills C (1993) *The Runaway Brain*. Basic Books

Wilson E O (2000) *Sociobiology: The New Synthesis*. Harvard University Press

Reference texts

Pough F H, Heiser J B & Mc Farland W N (1996) *Vertebrate Life* (4th Edn). Prentice Hall

Renfrew C & Bahn P (2012) *Archaeology: Theories, Methods and Practice* (6th Edn). Thames & Hudson

Sudbery P (2002) *Human Molecular Genetics* (2nd Edn). Prentice Hall

The Moodle site for this module gives hotlinks to a large number of useful websites.

10.3 Background Viewing (TV programmes)

(available on Box of Broadcasts, bobnational.net)

Origins of Us, 1, Bones (Alice Roberts)
Origins of Us, 2, Guts (Alice Roberts)
Origins of Us, 3, Brains (Alice Roberts)

How Earth Made Us, 1, Deep Earth (Iain Stewart)
How Earth Made Us, 2, Water (Iain Stewart)
How Earth Made Us, 3, Wind (Iain Stewart)
How Earth Made Us, 4, Fire (Iain Stewart)
How Earth Made Us, 5, Human Planet (Iain Stewart)

How to grow a planet, 1, Light (Iain Stewart)
How to grow a planet, 2, The Power of Flowers (Iain Stewart)
How to grow a planet, 3, The Challenger (Iain Stewart)

Horizon: *Did cooking make us human?*

11. PRESENTATION COURSEWORK SPECIFICATION AND MARK SHEET

Presentation coursework specification

The talk

As Moodle site for specification

Presentation mark sheet

Candidates:

Title:

Date:

Topic	*Mark*	*Comments*
CONTENT OF THE PRESENTATION		
Quality of explanation		
The main issues and events as presented in the standard account		
The main supporting evidence for this standard account		
Principal alternative accounts		
The research methods used to provide evidence and their limitations (?brief examples?)		
The temporal and geographical context of evidence		
The principal theories/hypotheses as to significance and origin		
Pertinent evidence from non-hominin species		
Significance of the topic for present-day human behaviour and sociality		
RE-presentation of lecture/textbook/Internet material		

Answering questions

GIVING THE PRESENTATION

Introducing the presentation

Distribution of coverage

Summarising/concluding the presentation

Relating to the audience

Eye contact

Clarity of voice

Verbal fluency

Use of AV equipment

Clarity of visuals

5 = excellent, 4 = good, 3 = satisfactory, 2 = poor, 1 = very poor

Examiner's name:

Examiner's signature:

Mark (%):

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